We claim:

1. A process for producing oil from an oil bearing feed wherein said feed is tar sand or oil shale, comprising the steps of:

a. introducing said feed in a fluidizable form into a fluidized bed reactor;

b. introducing a fluidizing medium into the fluidized bed reactor, said fluidizing medium including at least hydrogen;

c. fluidizing said introduced feed with said fluidizing medium in the reactor to form a fluidized bed;

d. continuously reacting said feed with substantially only hydrogen in the fluidized bed reactor at a temperature of at least 900°F;

e. continuously discharging a product stream and spent solids from said fluidized bed reactor.

2. The process of claim 1 further comprising the step of reducing the size of said feed to produce a fluidizable feed, prior to the feeding step.

3. The process of claim 2 wherein said feed is tar sand.

4. The process of claim 2 wherein said feed is shale.

5. The process of claim 3 wherein the tar sand is crushed to 1 inch or less size pieces.

6. The process of claim 1 wherein the introducing step a) comprises

injecting the feed adjacent a bottom end of the reactor and the discharging step e) comprises discharging said spent solids adjacent a top end of said reactor.

7. The process of claim 3 wherein the fluidizing medium contains substantially only hydrogen and the hydrogen is introduced into the reactor at a rate that exceeds the minimum required for complete tar sand reaction with hydrogen by a factor of between 15 and about 26.

8. The process of claim 7 wherein the fluidized bed a temperature and the fluidizing hydrogen entering the reactor has a temperature, wherein the fluidizing hydrogen temperature is greater than fluidized bed temperature.

9. The process of claim 8 wherein the fluidizing hydrogen temperature on entering the reactor is 1500°F.

10. The process of claim 7 wherein the flow rate of hydrogen exceeds the minimum required for complete tar sand reaction with hydrogen by a factor of about 21.

11. The process of claim 7 wherein the fluidizing hydrogen comprises make-up hydrogen and recycle hydrogen, and wherein the product stream includes recyclable unreacted hydrogen.

12. The process of claim 11 further comprising:

separating a gas mixture from the product stream, the gas mixture containing unreacted hydrogen;

purifying the gas mixture to form recycle hydrogen, wherein the recycle hydrogen contains substantially only unreacted hydrogen; and

returning at least a portion of the recycle hydrogen to the reactor.

13. The process of claim 12 further comprising maintaining combined level of methane and ethane in the recycle hydrogen at 5% or less by pressure swing adsorption.

14. The process of claim 12 wherein the unreacted hydrogen and the recycle hydrogen pressures do not fall below about 450 psi.

15. The process of claim 12 further comprising the step of:

admixing make-up hydrogen with the recycle hydrogen prior to returning the recycle hydrogen to the reactor.

16. The process of claim 1 wherein the tar sand or shale continuously reacts with substantially only hydrogen in the fluidized bed at about 600 psi and a temperature of 900°F to 1000°F.

17. The process of claim 1 wherein the tar sand or shale reacts with substantially only hydrogen by endothermic hydrocracking or exothermic hydrogenation or both.

18. A process for producing oil from tar sand or shale feed comprising:

introducing said feed in a fluidizable form into a fluidized bed reactor at a first temperature;

introducing a fluidizing hydrogen mixture into the fluidized bed reactor at a second temperature, wherein the second temperature is greater than said first temperature;

fluidizing said fluidizable feed by contacting the feed with the fluidizing hydrogen mixture to form a fluidized bed in the fluidized bed reactor

heating said feed to a third temperature by contacting the feed with the fluidizing hydrogen mixture and thereby maintaining the fluidized bed at said third temperature, wherein said third temperature is between said first temperature and said second temperature;

continuously reacting the feed with substantially only hydrogen in the fluidized bed reactor at the third temperature and at about 600 psi pressure; and

continuously discharging a product stream and spent solids from said fluidized bed reactor, wherein the product stream includes synthetic crude oil;

wherein the third temperature is between about 900°F and about 1000°F.

19. The process of claim 18 wherein:

the feed is tar sand;

the first temperature is less than about 100°F;

the second temperature is about 1500°F; and

the feed has a residence time in the reactor between about 5 and about 20 minutes.

20. The process of claim 19 wherein the fluidizing hydrogen mixture comprises at least about 95% hydrogen and wherein said hydrogen has a flow rate into the reactor between about 15 and about 26 times the flow rate required for complete tar sand reaction with hydrogen.

21. The process of claim 20 wherein the hydrogen flow rate into the reactor is 21 times the flow rate required for complete tar sand reaction with hydrogen, and wherein the third temperature is about 950°F.

22. The process of claim 20 wherein the feed is introduced into the reactor near the bottom of the fluidized bed reactor, and wherein spent solids are discharged near the top of the fluidized bed.

23. A reactor system for converting a tar sand or a shale feed into synthetic crude oil comprising:

a) a fluidized bed reactor including an oil shale or tar sand feed inlet

b) a feed introducing system connected to the feed inlet, wherein said feed introducing system includes;

a sizing and screening device for reducing the feed to 1 inch or less size pieces and removing pieces greater than about 1 inch, while maintaining the feed at a temperature of less than about 100°F, and

a feeder device for introducing the reduced feed into the reactor.

24. The reactor system of claim 23 wherein the fluidized bed reactor further includes:

a gas inlet for introducing a hydrogen mixture into said reactor; and

a product stream outlet for discharging a product stream from said reactor;

wherein the reactor system further comprises a hydrogen recycling system connected between the product stream outlet and the gas inlet.

25. The reactor system of claim 24 wherein the fluidized bed reactor further includes:

at least one separator at least partially located within said reactor and connected to said product stream outlet, wherein said separator removes entrained solids from said product stream as said stream discharges from the reactor and deposits said solids within said reactor, and

a spent solids outlet adjacent a top end of said reactor for discharging spent solids from said reactor.

26. The reactor system of claim 25, wherein the separator is a cyclone separator, and wherein the separating and purifying device includes a hot gas cleanup communicating with cyclone separator for separating fines entrained in the product stream discharged from the reactor.

27. The reactor system of claim 24 wherein:

the feed inlet is adjacent a bottom end of the reactor and introduces the feed approximately horizontally into the reactor;

the gas inlet is adjacent a bottom end of the reactor, and

the product stream outlet is adjacent a top end of the reactor.

28. The reactor system of claim 24 wherein the feed can react with hydrogen in the fluidized bed reactor at a desired temperature and pressure, wherein the hydrogen recycling system further includes;

a separating and purifying device for removing a substantially solids free hydrogen rich stream from the product stream to form a recycle hydrogen stream,

a mixing device for admixing a fresh hydrogen stream with the recycle hydrogen stream to form a hydrogen mixture,

a heater for heating a portion of said fresh hydrogen and recycle hydrogen streams to a temperature above the desired reaction temperature, and

a compressor for pressurizing the fresh hydrogen and the recycle hydrogen to a pressure above the desired reaction pressure.

29. The reactor system of claim 28 further comprising a heat exchanger communicating with said hot gas cleanup for transferring heat from a product stream exiting the hot gas cleanup to a portion of a hydrogen mixture stream exiting the compressor.

30. The reactor system of claim 29 wherein the separating and purifying device includes a gas-liquid separator for separating a product stream exiting the heat exchanger into a synthetic crude oil product stream and a gas stream.

31. The reactor system of claim 30 wherein the separating and purifying device includes a scrubbing system having an inlet connected to the gas-liquid separator, wherein the gas stream flows from the gas-liquid separator into the inlet of the scrubbing system, wherein the scrubbing system can remove impurities from the gas stream to produce a substantially pure hydrogen recycle stream.

32. The reactor system of claim 31 wherein the mixing device and the compressor are of unitary construction and comprise a compressor having a recycle hydrogen inlet connected to the scrubbing system and a fresh hydrogen inlet connected to a fresh hydrogen source, wherein the recycle hydrogen stream can flow into the recycle hydrogen inlet and fresh hydrogen can flow into the fresh hydrogen inlet, and wherein the recycle hydrogen and the fresh hydrogen mix in the compressor and are compressed to form a pressurized hydrogen mixture stream.

33. The reactor system of claim 32, wherein the compressor has a pressurized hydrogen mixture outlet connected to the heater via the heat exchanger, wherein the heater has an outlet connected to the reactor, and wherein the hydrogen mixture stream can flow from the compressor to the heat exchanger then to the heater, and then to the reactor.